

CLAIMS:

1. A method of decontaminating an enclosed space comprising the steps of providing an aqueous solution of  
5 hydrogen peroxide in the enclosed space, producing hydrogen peroxide/water vapour from said aqueous solution, creating an air stream in the enclosed space, introducing hydrogen peroxide/water vapour into the air stream, distributing the hydrogen peroxide/water vapour containing air stream  
10 throughout the space to be decontaminated and then removing the hydrogen peroxide/water vapour from the space; characterised in that the air stream is heated before hydrogen peroxide/water vapour is introduced to it, the hydrogen peroxide/water vapour is flash evaporated from an  
15 aqueous solution of hydrogen peroxide/water vapour from said supply into the air stream, and the air stream carrying the flash evaporated hydrogen peroxide/water vapour is distributed throughout the enclosed space to achieve bio-decontamination of the enclosed space.

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2. A method as claimed in claim 1, characterised in that hydrogen peroxide/water vapour is added to the flow of heated air distributed in the enclosure until the dew point of the vapour is reached and condensation of hydrogen  
25 peroxide/water vapour on the surfaces of the enclosure takes place following which the hydrogen peroxide is removed from the enclosed space.

3. A method as claimed in claim 2, characterised in that  
30 the condensation of the hydrogen peroxide/water vapour is measured by a monitor and when the condensation has reached

a requisite level, air flow containing hydrogen peroxide/water vapour is terminated.

4. A method as claimed in claim 2 or claim 3,  
5 characterised in that condensation is measured in the enclosure at a number of locations by condensation monitors to ensure that condensation has taken place throughout the enclosure.

10 5. A method as claimed in claim 1, characterised in that air carrying hydrogen peroxide/water vapour is introduced into the enclosure until a predetermined concentration of hydrogen peroxide/water vapour in the atmosphere in the enclosure has been reached after which introduction of the  
15 air is terminated and the hydrogen peroxide is removed.

6. A method as claimed in claim 5, characterised in that biological indicators are used in the enclosure to determine when the concentration of hydrogen peroxide/water vapour in  
20 the atmosphere in the enclosure has reached the requisite level following which the hydrogen peroxide is removed.

7. A method as claimed in any of the preceding claims, characterised in that the heated air carrying hydrogen  
25 peroxide/water vapour is delivered as a jet within the enclosure.

8. A method as claimed in claim 7, characterised in that the heated air carrying hydrogen peroxide/water vapour is  
30 delivered in a universally rotating jet to distribute the vapour throughout the enclosure.

9. A method as claimed in any of the preceding claims, characterised in that one or more fans are provided spaced from the source of air carrying hydrogen peroxide/ water vapour into the enclosure to deliver the air carrying the vapour to remote locations of the enclosure from said source.

10. A method as claimed in any of the preceding claims, characterised in that the vapour of hydrogen peroxide and water also contains peracetic acid.

11. A method as claimed in claim any of claims 1 to 9, characterised in that the solution from which the hydrogen peroxide/water vapour is produced contains 30 to 35% hydrogen peroxide and a balance of water.

12. A method as claimed in claim 10, characterised in that the solution from which the hydrogen peroxide solution is produced comprises 15% hydrogen peroxide, 0.5% peracetic acid and a balance of water.

13. A method as claimed in any of the preceding claims, characterised in that hydrogen peroxide is removed by circulating the air containing hydrogen peroxide over a catalyst.

14. A method as claimed in any of claims 1 to 8, characterised in that the enclosure has a heating/ventilation air conditioning system, the hydrogen peroxide is removed from the enclosure using the heating/ventilation air conditioning system.

15. A method as claimed in any of the preceding claims,  
characterised in that a plurality of heated air flows are  
provided to which the hydrogen peroxide/water vapour is  
added to provide a plurality of flows of heated air carrying  
5 hydrogen peroxide/water vapour at different locations in the  
enclosure.

16. A method as claimed in any of the preceding claims,  
characterised in that the method is controlled from outside  
10 the enclosure.

17. A method as claimed in any of the preceding claims,  
characterised in that the air is dehumidified to reduce the  
relative humidity in the enclosure to a predetermined level.  
15 prior to delivering heated air containing hydrogen  
peroxide/water vapour to the enclosure.

18. A method as claimed in claim 17, characterised in that  
the air is dehumidified using an air conditioned system for  
20 the enclosed space.

19. A method as claimed in any of the preceding claims,  
characterised in that a portable apparatus is used in the  
enclosure having a duct with a fan for delivering air  
25 through the duct, a filter for filtering air entering the  
duct, a heater for heating air passing through the duct and  
means for delivering hydrogen peroxide/water vapour to the  
air passing through the duct and a nozzle for delivery of  
air carrying hydrogen peroxide/ water vapour from the duct,  
30 the nozzle being rotated universally to distribute the  
hydrogen peroxide/water vapours throughout the enclosure,

circulation of air carrying the hydrogen peroxide/water vapour through the duct causing decontamination of the duct.

20. An apparatus for decontaminating an enclosed space  
5 comprising means (12,13) for providing a flow of heated air,  
and means (15,16) for delivering a liquid decontaminant to  
the heated air to be evaporated into the heated air to  
produce an air stream containing a vapour of the  
decontaminant for delivery to a space to be decontaminated;  
10 characterised in that the apparatus comprises a  
self-contained unit having a duct (10) to be positioned  
within the enclosed space having an inlet end and an outlet  
end, a fan (12) for causing air to flow from the enclosed  
space through the duct, a filter (11) for filtering air at  
15 the inlet end of the duct, means (15) for holding a supply  
of aqueous hydrogen peroxide solution, means (16) for  
delivering aqueous hydrogen peroxide solution from said  
holding means to a heater (14) to flash evaporate the  
aqueous hydrogen peroxide to produce hydrogen peroxide/water  
20 vapour which is entrained in the air flow passing through  
the duct, a nozzle (18) at the outlet end of the duct and  
means (17) to rotate the nozzle universally to deliver  
hydrogen peroxide/water vapour throughout the enclosure, all  
internal and external surfaces of the apparatus open to the  
25 enclosure being exposed to the hydrogen peroxide/water  
vapour carrying air in the enclosure to decontaminate the  
surfaces.

21. An apparatus as claimed in claim 20, characterised in  
30 that the components of the apparatus are mounted in a  
support (19) for transport of the apparatus.

22. An apparatus as claimed in claim 21, characterised in that the self-contained unit is a mobile or portable unit for movement from location to location where it is to be used.

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23. An apparatus as claimed in claim 22, characterised in that the supply (15) of hydrogen peroxide/water vapour and/or the nozzle and means (18a) to rotate the nozzle are readily removable for transport of the apparatus.

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24. An apparatus as claimed in any of claims 20 to 23 including a control box (70) for controlling operation of the apparatus, wherein means are provided for delivering air carrying hydrogen peroxide/water vapour from the atmosphere in the enclosure through the control box to decontaminate inner surfaces of the control box.

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25. An apparatus as claimed in any of claims 20 to 24 including a separate monitoring unit for monitoring the temperature of the atmosphere in the enclosure and the concentration of hydrogen peroxide/ water vapour in the atmosphere, wherein means are provided for delivering a flow of air carrying hydrogen peroxide/water vapour through the enclosure of the monitoring unit to decontaminate interior surfaces of the monitoring unit.

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provided for delivering a flow of air carrying hydrogen peroxide/water vapour through the enclosure of the monitoring unit to decontaminate interior surfaces of the monitoring unit.

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